

CLAIMS

Synthetic peptides of the monomer type with 13 to 33 amino acids or of the dimer type with 26 to 66 amino acids, in linear form or in a form cyclized by means of inter-cysteine disulphide bridges, corresponding to the general formula (I):



in which :

Δ represents a biotinyl radical, a biocytinyl radical, a hydrogen atom, an acetyl ($\text{CH}_3\text{CO-}$) radical, an aliphatic chain which may contain one or two thiol, aldehyde or amine functional groups, the aliphatic chain preferably being an alkyl chain of 1 to 6 carbon atoms or an alkenyl chain of 2 to 6 carbon atoms, or an aminoalkylcarbonyl chain of 2 to 6 carbon atoms,

-Z represents a peptide sequence of one of the formulae (II) to (X) :

$\text{-}\Xi_1\text{-Ser-}\Xi_2\text{-}$ (II)

$\text{-Ser-}\Xi_2\text{-}$ (III)

$\text{-}\Xi_1\text{-Ser-}$ (IV)

$\text{-}\Xi_1\text{-Gln-}\Xi_2\text{-}$ (V)

$\text{-Gln-}\Xi_2\text{-}$ (VI)

$\text{-}\Xi_1\text{-Gln-}$ (VII)

$\text{-}\Xi_1\text{-Asn-}\Xi_2\text{-}$ (VIII)

$\text{-Asn-}\Xi_2\text{-}$ (IX)

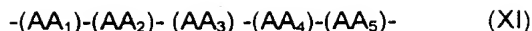
$\Xi_1\text{-Asn-}$ (X)

in which :

Ξ_1 represents a peptide sequence of 0 to 9 amino acids and

Ξ_2 represents a peptide sequence of 0 to 5 amino acids,

Θ represents a peptide sequence of formula (XI):

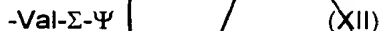


in which :

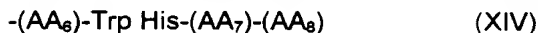
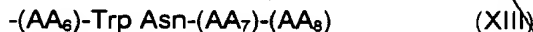
- (AA₁) represents either a lysine residue, or an arginine residue, or an ornithine residue,
 - (AA₂) represents either a glycine residue, or an asparagine residue,
 - (AA₃) represents either a lysine residue, or an arginine residue, or an ornithine residue,
 - (AA₄) represents either a leucine residue, or an alanine residue, or an isoleucine residue, or a glutamine residue,
 - (AA₅) represents either an isoleucine residue, or a valine residue, or a leucine residue, or a threonine residue, or a norleucine residue, or a norvaline residue,
- provided, however, that (AA₁), (AA₂), (AA₃), (AA₄) and (AA₅) never form together the peptide sequences -Lys Gly Lys Leu Ile- and -Lys Gly Lys Leu Val-,

-Ω, attached to the -CO- group of serine, represents:

- a hydroxyl (-OH) radical or an amine (-NH₂) radical,
- an alkoxy radical comprising from 1 to 6 carbon atoms,
- a peptide sequence of formula (XII) :



in which Σ represents a sequence of formula (XIII) or of formula (XIV) :



in which :

- (AA₆) represents an amino acid different from lysine,
- (AA₇) represents an amino acid,
- (AA₈) represents a serine or threonine residue,

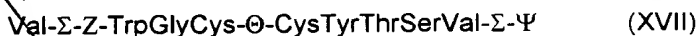
and Ψ, attached to the -CO- residue of the free AA₈ amino acid, represents an OH or NH₂ group or an alkoxy radical comprising from 1 to 6 carbon atoms,

- a peptide sequence of formula (XV) :



in which Ψ , attached to the -CO- residue of valine, has the same meaning as for the formula (XII),

- or a peptide sequence of formula (XVI) to (XVIII) :



in which Z and Θ have the definition given for the formula (I) and Σ has the definition given for the formula (XII) and Ψ , attached to the -CO- residue of serine, on the -CO- residue of the AA_8 amino acid or on the -CO- residue of valine, has the same meaning as for the formula (XII).

2. Synthetic peptides of formula (I) according to Claim 1, in which (AA_5) represents either a valine residue, or a leucine residue, or a threonine residue and when Ω corresponds to a peptide sequence of formula (XII) or (XIV), (AA_6) represents either a glutamine residue or an arginine residue.

3. Synthetic peptides of formula (I), according to Claim 1, in which:

Δ represents a biotinyl radical, a hydrogen atom or an aliphatic chain which may contain one or two thiol, aldehyde or amine functional groups, the aliphatic chain preferably being an alkyl chain of 1 to 6 carbon atoms, or an aminoalkylcarbonyl chain of 2 to 6 carbon atoms,

-Z represents a peptide sequence of formula (II) or (V), in which Ξ_1 represents a peptide sequence of two amino acids and Ξ_2 represents an amino acid, or a sequence of formula (IV), in which Ξ_1 represents three amino acids, or a peptide sequence of formula (VIII), in which Ξ_1 represents a peptide sequence of nine, eight or three amino acids and Ξ_2 a

peptide sequence of five amino acids,

-Θ represents a peptide sequence of formula:

- Lys Gly Arg Leu Val-,
- Arg Gly Lys Ala Val-,
- Arg Gly Arg Leu Val-,

or

-Arg Gly Arg Ala Val-,

and

-Ω represents a hydroxyl group, the peptide sequence (XV) or one of the following sequences which correspond to the peptide sequence of formula (XII) :

- Val Arg Trp Asn Glu Thr-Ψ,
- Val Gln Trp Asn Glu Thr-Ψ

or

- Val Gln Trp Asn Ser Thr-Ψ.

4. Synthetic peptides of formula (I), according to one of Claims 1 to 3, in which Z represents a peptide sequence of formula:

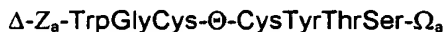
- -Leu Leu Ser Ser-
- -Leu Leu Asn Ser-
- -Arg Leu Asn Ser-
- -Ala Leu Glu Thr Leu Leu Gln Asn Gln Gln Leu Leu Asn Ser-
- -Ala Leu Glu Thr Leu Leu Gln Asn Gln Gln Leu Leu Asp Leu-
- -Ala Leu Glu Thr Leu Leu Gln Asn Gln Gln Leu Leu Asn Ile-
- -Leu Asn Gln Gln Arg Leu Leu Asn Ser-

or

- -Arg Ala Leu Glu Thr Leu Leu Asn Gln Gln Arg Leu Leu Asn Ser-

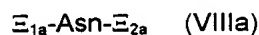
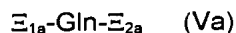
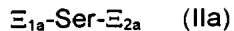
5. Synthetic peptides of 20 to 50 amino acids according to Claim 1, of

formula (Ia):



(Ia)

in which Z_a represents a radical of formulae IIa to Xa :



in which :

$-\Xi_{1a}$ represents a peptide sequence of 1 to 5 amino acids
and

$-\Xi_{2a}$ an amino acid,

$-\Omega_a$ represents a peptide sequence of formula (XII), as
defined for the formula (I), or a peptide sequence of formula
(XVIIa) :



and

Δ , Θ , Σ and Ψ have the same meaning as for the formula (I).

6. Synthetic peptides of formula (I) according to one of Claims 1 to 5
including one of the following sequences:

Sequence No. 1

-LLSLWGCRGKAVCYTSVQWNET-

or

-Leu Leu Ser Leu Trp Gly Cys Arg Gly Lys Ala Val Cys Tyr Thr Ser Val Gln Trp Asn

5

1

5

10

15

20

Glu Thr-

22

Sequence No. 2

10 -LLSLWGCRGRLVCYTSVQWNET-

or

-Leu Leu Ser Leu Trp Gly Cys Arg Gly Arg Leu Val Cys Tyr Thr Ser Val Gln Trp Asn

1

5

10

15

20

Glu Thr-

15

22

Sequence No. 3

-LLSSWGCKGRLVCYTSVQWNET-

or

20 -Leu Leu Ser Ser Trp Gly Cys Lys Gly Arg Leu Val Cys Tyr Thr Ser Val Gln Trp Asn

1

5

10

15

20

Glu Thr-

22

25 Sequence No. 4

-LLSSWGCKGRLVCYTSVQWNST-

or

-Leu Leu Ser Ser Trp Gly Cys Lys Gly Arg Leu Val Cys Tyr Thr Ser Val Gln Trp Asn

1

5

10

15

20

30

Ser Thr-

22

Sequence No. 5

-LLQSWGCKGRLVCYTSVQWNST-

or

-Leu Leu Gln Ser Trp Gly Cys Lys Gly Arg Leu alV Cys Tyr Thr Ser Val Gln Trp Asn

5

1

5

10

15

20

Ser Thr

22

Sequence No. 6

10 -LLNSWGCRGKAVCYTSVQWNET-

or

-Leu Leu Asn Ser Trp Gly Cys Arg Gly Lys Ala Val Cys Tyr Thr Ser Val Gln Trp Asn

1

5

10

15

20

Glu Thr-

15

22

Sequence No. 7

-LLSLWGCRGRAVCYTSVQWNET-

or

20 -Leu Leu Ser Leu Trp Gly Cys Arg Gly Arg Ala Val Cys Tyr Thr Ser Val Gln Trp Asn

1

5

10

15

20

Glu Thr-

22

25 Sequence No. 8

-LLSSWGCRGRLVCYTSVQWNET-

or

-Leu Leu Ser Ser Trp Gly Cys Arg Gly Arg Leu Val Cys Tyr Thr Ser Val Gln Trp Asn

1

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10

15

20

30

Glu Thr-

22

Sequence No. 9 :~~-LLSSWGCKGRLVCYTS-~~~~or~~~~-Leu Leu Ser Ser Trp Gly Cys Lys Gly Arg Leu Val Cys Tyr Thr Ser-~~~~5 1 5 10 15~~Sequence No. 10 :~~-LLNSWGCKGRLVCYTS-~~~~or~~~~10 -Leu Leu Asn Ser Trp Gly Cys Lys Gly Arg Leu Val Cys Tyr Thr Ser-~~~~1 5 10 15~~Sequence No. 11 :~~-ALETLLQNQQLNSWGCRGRLVCYTSVRWNET-~~~~15 or~~~~-Ala Leu Glu Thr Leu Leu Gln Asn Gln Gln Leu Leu Asn Ser Trp Gly Cys Arg Gly~~~~1 5 10 15~~~~Arg Leu Val Cys Tyr Thr Ser Val Arg Trp Asn Glu Thr-~~~~20 25 30~~~~20~~Sequence No. 12 :~~-ALETLLQNQQLNIWGCRGRLVCYTSVRWNET-~~~~or~~~~-Ala Leu Glu Thr Leu Leu Gln Asn Gln Gln Leu Leu Asn Ile Trp Gly Cys Arg Gly~~~~25 1 5 10 15~~~~Arg Leu Val Cys Tyr Thr Ser Val Arg Trp Asn Glu Thr-~~~~20 25 30~~Sequence No. 13 :~~30 -ALETLLQNQQLDLWGCRGRLVCYTSVRWNET-~~~~or~~~~-Ala Leu Glu Thr Leu Leu Gln Asn Gln Gln Leu Leu Asp Leu Trp Gly Cys Arg Gly~~~~1 5 10 15~~~~Arg Leu Val Cys Tyr Thr Ser Val Arg Trp Asn Glu Thr-~~~~35 20 25 30~~

Sequence No. 14 :

-LNQQRLLNSWGCKGRLVCYTSV-

or

-Leu Asn Gln Gln Arg Leu Leu Asn Ser Trp Gly Cys Lys Gly Arg Leu Val Cys Tyr

5

1

5

10

15

Thr Ser Val-

20

Sequence No. 15 :

10 -RALETLLNQQRLLNSWGCKGRLVCYTSV-

or

- Arg Ala Leu Glu Thr Leu Leu Asn Gln Gln Arg Leu Leu Asn Ser Trp Gly Cys Lys

1

5

10

15

Gly Arg Leu Val Cys Tyr Thr Ser Val-

15

20

25

Sequence No. 16 :

-RLNSWGCKGRLVCYTSV-

or

20 - Arg Leu Asn Ser Trp Gly Cys Lys Gly Arg Leu Val Cys Tyr Thr Ser Val-

1

5

10

15

7. Synthetic peptides, according to one of Claims 1 to 6, of sequence:

25 PEPTIDE No. 1 (2B)

LLSLWGCRGKAVCYTSVQWNET

or

Leu Leu Ser Leu Trp Gly Cys Arg Gly Lys Ala Val Cys Tyr Thr Ser Val Gln Trp Asn

1

5

10

15

20

30 Glu Thr

22

PEPTIDE No. 2 (3B)

LLSLWGCRGRLVCYTSVQWNET

35 or

Leu Leu Ser Leu Trp Gly Cys Arg Gly Arg Leu Val Cys Tyr Thr Ser Val Gln Trp Asn

1 5 10 15 20

Glu Thr

22

5

PEPTIDE No. 3 (4B)

LLSSWGCKGRLVCYTSVQWNET

or

Leu Leu Ser Ser Trp Gly Cys Lys Gly Arg Leu Val Cys Tyr Thr Ser Val Gln Trp Asn

10 1 5 10 15 20

Glu Thr

22

PEPTIDE No. 4 (5B)

15 LLSSWGCKGRLVCYTSVQWNST

or

Leu Leu Ser Ser Trp Gly Cys Lys Gly Arg Leu Val Cys Tyr Thr Ser Val Gln Trp Asn

1 5 10 15 20

Ser Thr

20 22

PEPTIDE No. 5 (6B)

LLQSWGCKGRLVCYTSVQWNST

or

25 Leu Leu Gln Ser Trp Gly Cys Lys Gly Arg Leu Val Cys Tyr Thr Ser Val Gln Trp Asn

1 5 10 15 20

Ser Thr

22

30 PEPTIDE No. 6

LLNSWGCRGKAVCYTSVQWNET

or

Leu Leu Asn Ser Trp Gly Cys Arg Gly Lys Ala Val Cys Tyr Thr Ser Val Gln Trp Asn

1 5 10 15 20

35 Glu Thr

22

SECRETED

PEPTIDE No. 7

LLSLWGCRGRAVCYTSVQWNET

or

Leu Leu Ser Leu Trp Gly Cys Arg Gly Arg Ala Val Cys Tyr Thr Ser Val Gln Trp Asn

5 1 5 10 15 20

Glu Thr

22

PEPTIDE No. 8 (7B)

10 LLSSWGCRGRLVCYTSVQWNET

or

Leu Leu Ser Ser Trp Gly Cys Arg Gly Arg Leu Val Cys Tyr Thr Ser Val Gln Trp Asn

1 5 10 15 20

Glu Thr

15 22

PEPTIDE No. 9 (12B)

LLSSWGCKGRLVCYTS

or

20 Leu Leu Ser Ser Trp Gly Cys Lys Gly Arg Leu Val Cys Tyr Thr Ser

1 5 10 15

PEPTIDE No. 10 (14B)

LLNSWGCKGRLVCYTS

25 or

Leu Leu Asn Ser Trp Gly Cys Lys Gly Arg Leu Val Cys Tyr Thr Ser

1 5 10 15

PEPTIDE No. 11 (18B)

30 ALETLLQNQQLLNSWGCRGRLVCYTSVRWNET

or

Ala Leu Glu Thr Leu Leu Gln Asn Gln Gln Leu Leu Asn Ser Trp Gly Cys Arg Gly

1 5 10 15

Arg Leu Val Cys Tyr Thr Ser Val Arg Trp Asn Glu Thr

35 20 25 30

PEPTIDE NO. 12 (19B)

ALETLLQNQQLLNIWGCRGRLVCYTSVRWNET

or

Ala Leu Glu Thr Leu Leu Gln Asn Gln Gln Leu Leu Asn Ile Trp Gly Cys Arg Gly

5 1 5 10 15

Arg Leu Val Cys Tyr Thr Ser Val Arg Trp Asn Glu Thr

20 25 30

PEPTIDE No. 13 (20B)

10 ALETLLQNQQLLDLWGCRGRLVCYTSVRWNET

or

-Ala Leu Glu Thr Leu Leu Gln Asn Gln Gln Leu Leu Asp Leu Trp Gly Cys Arg Gly

1 5 10 15

Arg Leu Val Cys Tyr Thr Ser Val Arg Trp Asn Glu Thr

15 20 25 30

PEPTIDE No. 14 (21B)

LNQQRLLNSWGCKGRLVCYTSV

or

20 Leu Asn Gln Gln Arg Leu Leu Asn Ser Trp Gly Cys Lys Gly Arg Leu Val Cys Tyr

1 5 10 15

Thr Ser Val

20

25 PEPTIDE No. 15 (22B)

RALETLLNQQRLLNSWGCKGRLVCYTSV

or

Arg Ala Leu Glu Thr Leu Leu Asn Gln Gln Arg Leu Leu Asn Ser Trp Gly Cys Lys

1 5 10 15

30 Gly Arg Leu Val Cys Tyr Thr Ser Val

20 25

PEPTIDE No. 16 (23B)

RLNSWGCKGRLVCYTSV

35 or

Arg Leu Asn Ser Trp Gly Cys Lys Gly Arg Leu Val Cys Tyr Thr Ser Val

Add A'

add

add F!